PROCEEDINGS OF THE
ROYAL ENTOMOLOGICAL SOCIETY
OF LONDON

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ORDINARY MEETING

WEDNESDAY, 3rd OCTOBER, at 5.30 p.m.

AGENDA

1. Confirmation of the Proceedings of the Ordinary Meeting held on 4th July, 1956.
2. Recommendations of candidates for Fellowship. First reading.
3. Recommendations of candidates for Fellowship. Second reading.
4. Announcement of election of new Fellows.
5. Additions to the Library [see p. 29].
6. Admission of Fellows.
7. Papers accepted for publication in the *Transactions*.
8. Exhibits.

Fellows are particularly requested to bring suitable exhibits to the Meeting even though it may not be possible to announce their intention to do so beforehand.

> *Note.*—To avoid congestion in the Library and to enable exhibits to be displayed to greater advantage, a table has been placed in the meeting-room for this purpose. Fellows are asked to place their exhibits on this table, with a suitable explanatory note, as soon as possible on the afternoon of the meeting, so that they are available for inspection there before the meeting opens.

9. Communications.

Dr. P. T. Haskell.

Courtship and mating behaviour in certain grasshoppers.

[Abstract.]

The courtship and mating behaviour of the grasshoppers *Omocestus viridulus*, *Chorthippus brunneus* and *Chorthippus parallelus* is initiated and controlled by sound signals. The males of the species have two songs used in this behaviour : the " normal song " which attracts the female to the male, and the " courtship song " which the male sings when the female is within visual distance and which produces in the female a quiescent state enabling the male to engage the genitalia.

The physiological state of the female is most important in this behaviour pattern ; virgin, mature females are attracted by the normal song, but the act of mating inhibits further responses during the life of the female provided she remains in the company of males. If a mated female is removed and kept solitary, the response is recovered in a time which varies with the species. The response is also temporarily inhibited by approaching oviposition. This courtship behaviour will be described and illustrated with recordings of the relevant stridulation, and the possible nature of the inhibitory mechanism will be discussed.

Tea will be served in the Library before the meeting.

NOTICES.

Provision of refreshments after Ordinary Meetings.

The Council of the Society has decided that coffee and biscuits shall be provided in the Society's rooms following Ordinary Meetings. A charge of one shilling per person will be made. Visitors will be welcomed, provided they are introduced and paid for by Fellows.

The serving of refreshments will cease and the house will be closed not later than 60 minutes after the end of the meeting. It will not be possible to keep the Library open during this time and it will therefore continue to be closed at the end of the meeting.

As the number it will be necessary to cater for must be known in advance, Fellows are asked to give prior notice of their intention to stay by signing their names on a list, which will be placed beside the Attendance Book, before 5.30 p.m.

Forthcoming Ordinary Meetings.

Preliminary notice is given below of the principal papers to be read at the next two Ordinary Meetings.

7th November.

Mr. Dennis Leston.—Shieldbug systematics : a study in phylogenetic methods.

5th December.

As in previous years, this meeting will be devoted to small exhibits of special interest requiring only short explanations.

PROCEEDINGS OF THE ORDINARY MEETING HELD ON 4TH JULY, 1956.

Dr. W. J. HALL, C.M.G., M.C., President, in the Chair.

Present, 85 Fellows and 12 Visitors.

The minutes of the Ordinary Meeting held on 6th June were confirmed and signed by the President.

The names of the following candidates for election were read for the first time: Mr. Awad Ahdin Ali; Mrs. Ivy Doreen Classey; Mr. Gavin John Hitchings; Mr. Taro Iwase; Dr. K. N. Katiyar, M.Sc.; Miss Mary K. Kraft, B.Sc.; Mr. Charles William Lamb; Mr. Edward Alexander Mackay; Mr. George Millar; Dr. Edwin Richard Nye; Mr. Michael James Parr; Mr. B. Sripathi Rao, M.A.; Mr. M. I. Thomas; Mr. Jeremy David Weller; Mr. John Kenneth Williams.

For the second time (taken as read): Mr. Peter Frederick Beales; Mr. Cunteepuram Krishnamoorthy, B.Sc.; Dr. Basil Joseph MacNulty, B.Sc., Ph.D.; Dr. S. V. Pingale, B.Sc., Ph.D.; Mr. V. Ramakrishna; Mr. R. C. Satija, M.Sc.; and Mr. Jack Zinn, M.Sc.

The Secretary read the names of the following newly elected Fellows of the Society: Mr. Constantine Herbert Fernando, Christ Church, Oxford; Mr. William James Knight, B.Sc., 47, Bond Street, Englefield Green, Surrey; Mr. Jeremy Bedford Russell, Mill House, Sandford St. Martin, Oxon.; Miss Kate Fraser Salmond, P.O. Box 842, Lusaka, N. Rhodesia.

Thanks were voted to donors of gifts to the Library since the last meeting.

Mr. B. R. Champ, Mr. C. L. Nissen, Mr. J. Bedford Russell, Mr. M. P. Singh and Mr. H. J. Viljoen signed the Obligation Book and were admitted Fellows of the Society.

Mr. R. W. J. Uffen exhibited a series of the Pyralid moth *Heterographis oblitella* Zeller (Phycitinae) from Benfleet, Essex. The series was kindly lent by Mr. S. Wakely, who took them from a breeding colony found by Mr. H. C. Huggins and the exhibitor on a large cindery rubbish dump at a field meeting on 5th May, 1956.

The high surface temperature caused by insolation and possibly an elevation of soil temperature by decomposition may have helped to establish the species, as is the case with some Hemiptera-Heteroptera found in such places. The species was formerly regarded as a rare migrant to this country.

Two living larvae were also shown, one of which moulted to the fourth instar on the afternoon of the meeting. The larvae of the genus *Heterographis* have hitherto been unknown, except that a dark species very distinct from *oblitella*, but included in the British Museum collection as a synonym of this species, has been bred from *Acacia* flowers from Algeria. The larvae were apparently not described.

Professor Carroll Williams (a visitor) gave a paper on Insect Metamorphosis, an abstract of which appeared on page 20.

The subsequent discussion was opened by Dr. H. E. Hinton, who said he was very struck by Professor Williams' very definite statement that regressive changes do not occur when corpora allata are implanted, as earlier workers had all expressed the view that regressive changes did occur.

Professor Williams said that it was important to decide whether the corpora allata hormone only acted as a brake on development, or whether it actually had a regressive effect. He himself had never observed a regressive effect and he preferred to think of the corpora allata as producing a "status quo hormone" rather than a "juvenile hormone."

Dr. Hinton said that he had previously accepted the view that ontogenetic regressions were possible because of the claims of Wigglesworth and Peipho. He had examined many naturally formed scars and had noted that the external form of the new cuticle was sufficiently variable to provide, by appropriate selection, support for either view.

Professor O. W. Richards said he understood that something described as regression occurred in termites. Professor Williams said that almost anything could be done with the totipotent termite but there was a critical point beyond which regression could not occur. There seemed to be a succession of phases of stability to which the animals would gravitate. The critical point was that immediately after moulting, and determination occurred within 24 hours.

Dr. Hinton said that Professor Lüscher had shown that there could be no regression so far as supplementary reproductives were concerned because their prothoracic glands degenerate and they can therefore no longer moult. The reason why all of the multipotent forms did not become supplementary reproductives with the removal of the king or queen or both was that they did not moult in phase and their sensitivity fell off rapidly after the moulting period.

Dr. Mellanby enquired how the quantity of corpus allatum hormone from the male abdomen compared with that from the corpora allata. Professor Williams said the corpora allata seemed to have no effect in adult moths but the hormone was produced in the adult moths and did not come from storage. If before the fourth day corpora allata were taken out, none of the hormone was produced. The male abdomen continuously extracts corpora allata hormone from blood. One male gives 0·2 c.c. of this active oil and 0·025 c.c. gives a positive response, so that the male abdomen is a very rich source of corpora allata hormone.

Dr. Hinton said that the Saturnidae are a very highly specialised group of moths that do not require to feed or drink in order to produce eggs, whereas more primitive moths do require to feed and drink. In the latter, corpora allata are required to activate reserves into eggs, whereas in the Saturnidae the eggs are already mature in the new adult. It might be that the secretion of the hormone was a relic of a more primitive condition.

Dr. A. G. Hamilton enquired whether Professor Williams had injected any of the extract into other female insects, to which Professor Williams replied that he had done so with *Rhodnius*, which was a more suitable insect for this purpose than the Saturnidae.

Mr. E. C. Zimmerman said he would like some explanation as to how these animals, after operation, continued to live in such septic conditions. Professor Williams replied that the blood contained a bacteriostatic agent so that if the blood were not diluted they did not become septic. Professor Williams also said that it was a good idea to block the action of the tyrosinase in the blood by adding phenothiourea.

Mr. Zimmerman said that a critical temperature of 6° C. had been mentioned and he wondered what would happen under warmer conditions. Professor Williams said the optimum temperature for restoration of brain activity was 10–15° C.

Dr. Waloff asked Professor Williams for his views on the recent Japanese work on diapause.

Professor Williams replied that there would seem to be no doubt that whether the eggs of the silkworm were to diapause or not was determined in the female and that this determination was under the direct control of the brain. The brain determined whether or not the diapause factor was to be liberated by the suboesophageal ganglion.

E. B. BRITTON, *Honorary Secretary.*

The next meeting will be held on 7th November at 5.30 p.m.

ADDITIONS TO THE LIBRARY.

Presented.

Carvalho, J. C. M., *and* Southwood, T. R. E. Revisão do complexo *Cyrtorhinus* Fieber- *Mecomma* Fieber (Hemiptera-Heteroptera, Miridae). *Bol. Mus. Goeldi* **11** (1) : 72 pp. 1955. [Dr. T. R. E. Southwood.]

Easton, A. M. The *Meligethes* of North Africa (Coleoptera, Nitidulidae). 8vo. Paris and Rabat. 1955. [*Mém. Soc. Sci. nat. Maroc.* (N.S.) **2**.] [The Author.]

Journal Russe de Zoologie. Vol. 1. 4to. Petrograd. 1916. [National Central Library.]

Kimmins, D. E. A revised key to the adults of the British species of Ephemeroptera. *Sci. Publ. Freshw. biol. Assoc. Brit. Emp.* **15** : 71 pp. 1954. [Freshwater Biological Association.]

Klucze do oznaczania owadów Polski. [*Keys for the identification of Polish insects.*] 8vo. Warsaw. 1954. (In Polish.)

8. Pt. XXVIII. fasc. 19. *Diptera, Erinnidae,* by P. Trojan. 1956.
9. Pt. XXVIII. fasc. 23. *Diptera, Cyrtidae,* by P. Trojan. 1956.
10. Pt. XXVIII. fasc. 26. *Diptera, Omphralidae,* by P. Trojan. 1956.
11. Pts. IX–X. *Blattodea, Mantodea,* by W. Bazyluk. 1956.
12. Pt. XII. *Dermaptera,* by W. Bazyluk. 1956.
13. Pt. XXVIII. fasc. 77–78. *Diptera, Hippoboscidae-Nycteribiidae,* by S. Kozlowski. 1956.
14. Pt. XXIV. fasc. 2–3. *Hymenoptera, Siricidae-Oryssidae,* by B. Pisarski. 1956.
15. Pt. XXVII. fasc. 53*a*. *Lepidoptera, Noctuidae,* by A. S. Kostrowicki. 1956.

[The Editorial Committee, Polish Academy of Sciences, Warsaw.]

Kozhanchikov, I. V. [*Lepidoptera.* Tom. III. no. 2. *Psychidae.*] 8vo. Moscow and Leningrad. 1956. *Fauna of U.S.S.R.* (N.S.) **62**. (In Russian.) [Academy of Sciences of U.S.S.R. By exchange.]

Lima, A. da Costa. *Insetos do Brasil.* 10° tomo. *Coleópteros.* 4*a.* ultimo parte. 8vo. Rio de Janeiro. 1956. [The Author.]

Miller, N. C. E. *The biology of the Heteroptera.* 8vo. London. 1956. [The Author.]

Snodgrass, R. E. *Anatomy of the Honey bee.* 8vo. Ithaca, New York. 1956. [The Author.]

Weis-Fogh, T., and Jensen, M. Biology and physics of locust flight. I–IV. *Phil. Trans.* (B) **239** : 415–585, 1956. [The Royal Society. By exchange.]

Purchased.

Asahina, S. *A morphological study of a relic dragonfly* Epiophlebia superstes. Large 8vo. Tokyo. 1954.

Blasche, P. *Raupenkalender für das mitteleuropäische Faunengebiet.* Sm. 8vo. Stuttgart. 1955.

Ceballos, G. *Catalogo de los Himenopteros de Espana.* 8vo. Madrid. 1956.

Inoue, H. *Check list of the Lepidoptera of Japan.* Pt. 1. *Micropterigidae-Phaloniidae.* Pt. 3. *Geometridae.* 8vo. Rikusuisha. 1954, 1956.

Insects of Micronesia. 8vo. Bernice P. Bisop Museum : Honolulu, 1954.

Vol. 6, no. 1. *Homoptera, Aleyrodidae,* by R. Takahashi. 1956.
Vol. 6, no. 2. *Homoptera, Aphididae,* by E. O. Essig. 1956.
Vol. 7, no. 1. *Heteroptera, Miridae,* by J. C. M. Carvalho. 1956.
Vol. 7, no. 2. *Heteroptera, Tingidae,* by C. J. Drake. 1956.

Vol. 8, no. 1. *Embioptera*, by E. S. Ross. 1955.
Vol. 13, no. 1. *Diptera, Dorilaidae* (*Pipunculidae*), by D. E. Hardy. 1956.
Vol. 14, no. 1. *Diptera, Tephritidae*, by D. E. Hardy and M. Adachi. 1956.
Vol. 17, no. 1. *Coleoptera, Chrysomelidae*, by J. L. Gressitt. 1955.
Vol. 17, no. 2. *Coleoptera, Cerambycidae*, by J. L. Gressitt. 1956.
Vol. 19, no. 1. *Hymenoptera, Trichogtammatidae* and *Mymaridae*, by R. L. Doutt. 1955.

Pennak, W. *Freshwater invertebrates of the United States.* 8vo. New York. 1953.

Stichel, W. *Illustrierte Bestimmungstabellen der Deutschen Wanzen* (*Hemiptera-Heteroptera*) Lief. 1–16. 8vo. Berlin-Hermsdorf. 1925–38.

Stichel, W. *Illustrierte Bestimmungstabellen der Wanzen.* II. *Europa.* Hft. 9–11. 8vo. Berlin-Hermsdorf. 1956.

Wagstaffe, R., *and* Fidler, J. H. *The preservation of Natural History specimens.* 1. *Invertebrates.* Large 8vo. London. 1955.

In addition, separates have been presented by Dr. Gertrude Pleskot; Dr. D. J. Lewis; American Entomological Society; Department of Entomology, London School of Hygiene and Tropical Medicine; Director, Virus Research Institute, Entebbe; Mr. H. E. Paterson; Miss D. J. Jackson; Companhia de Diamentes de Angola; Professor F. J. O'Rourke; Società generale per l'industria, mineraria e chimica, Montecatini; Dr. C. A. Clarke; Professor V. B. Wigglesworth; Professor J. Lane; Mr. E. A. J. Duffy; Mr. D. W. Empson; Mr. W. Bunting; Nature Conservancy; State Plant Board of Florida; Smithsonian Institution; Department of Agriculture of Southern Rhodesia; Director, E.A.T.R.O., Tororo; Rothamsted Experimental Station; United States Department of Agriculture; Director, Tsetse Control Department, Uganda; Mr. E. R. Shagudian; Department of Zoology, Glasgow University; Dr. H. F. Jung; Freshwater Biological Association; Imperial Chemcial Industries Ltd.; Commonwealth Institute of Entomology; and the Director, Chicago Natural History Museum.

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